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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.:	R14-0024B
Plant ID No.:	061-00134
Applicant:	Longview Power, LLC
Facility Name:	Maidsville
Location:	Maidsville
SIC Code:	4911
Application Type:	Modification
Received Date:	November 6, 2009
Engineer Assigned:	Edward S. Andrews, P.E.
Fee Amount:	$1000.00
Date Received:	November 6, 2009
Completeness Date:	January 13, 2010
Due Date:	April 13, 2010
Newspaper:	*The Dominion Post*
Applicant Ad Date:	November 6, 2009
UTMs:	Easting: 589.2 km Northing: 4,395.7 km Zone: 17
Description:	Applicant request to expand the area from which allowances may be obtained to mitigate acid deposition visibility impacts to Class I areas.

DESCRIPTION OF PROCESS

Longview Power proposed to construct a power generating facility near Maidsville, WV. As required under the Clean Air Act, Longview Power request and obtained a "Prevention of Signification Deterioration" (PSD) Permit, which was issued by this agency on March 11, 2004.

In response to the comments received during first public comment period of this PSD review, Longview Power proposed an mitigation plan in effort minimize the effects from the

predicted impacts associated with the potential emissions from the PC boiler. The DAQ worked in conjunction with Longview Power, the U.S. Forest Service, and the National Park Service, developed a mitigation plan to reduce impacts on visibility and acid deposition at the Class I areas, which is outlined as Condition A.20. in Permit R14-0024A.

This plan calls for Longview to obtain allowances allocated to sources under the Acid Rain Program (listed in Part 73) located within the original modeling domain. This plan requires Longview to retire these allowances instead of using them for compliance purposes under Acid Rain or Clean Air Instate Rule (CAIR). Therefore, Longview would have to obtain at least 3.1 allowances for every ton of sulfur dioxide (SO_2) emitted. Assumed that Longview was able to obtain allowances either in the Northwest or the Southwest quadrants, where the offset ratio is 1:1, plus 10% or 0.1. Two of these allowances would be required as part to demonstrated compliance with Acid Rain and CAIR.

Starting in August of 2008, Longview identified the eligible facilities within the coordinates that were allocated allowances under 40 CFR 73 (Part 73 Listed). Only 8 eligible facilities existed within the specified coordinates, five within the Northwest Quadrant, 2 within the Northeast, and one in the Southeast. A single owner (Allegheny Energy) owns all of the facilities located in the Northwest. A second owner (Dominion) owns two of the three facilities in the other quadrants with the remaining facility being owned by Allegheny as well.

According to Longview, Longview Power worked through Evolution Markets Inc., a prominent brokerage firm that trades emission allowances, to approach these two owners. After repeated requests, both owners declined to sell or trade their eligible allowances. All of these efforts were unsuccessful. Allegheny Energy and Dominion are the owners and/or operators of the Part 73 listed sources in the mitigation area. This does not mean that these two owners own all of the Acid Rain sources but merely these are the two owners of the SO_2 allowances that were allocated accordingly to Part 73 to the sources located in this area.

Enforcement actions and the promulgation of CAIR have reduced of amount of excess allowances being held by these utility operators, which are allocated allowances under Part 73. CAIR reduced the value of the SO_2 allowance from 1 allowance equate to 1 one ton of SO_2 emitted (1 to1) to 1 allowance is worth 0.5 ton of SO_2 or 2:1 ratio. U.S. EPA has reached signed agreements with Virginia Electric and Power Company, which is now Dominion. These actions have reduced the available excess allowances, which was a underlining flaw of the Acid Rain program.

U.S. EPA has made accusations that Allegheny Energy has avoid PSD requirements when make some changes or improvements at some of their facilities. Currently, there is no settlement agreement resolving these accusations. Given that Dominion as well as other electric utility operators have settled alleged PSD violations, if Allegheny settles with EPA it will most likely include the surrendering of SO_2 allowances. Thus, the amount of excess allowances that these sources have or could generate is or will be significantly reduced. This may be one reason why Allegheny Energy and Dominion have not elected to sell any of their excess allowances to Longview.

As result of these unsuccessful efforts, Longview approached the DAQ about expanding the area that Longview can obtain allowances to meets the requirements of this mitigation plan. On March 9, 2009, Longview Power submitted a modeling protocol for review to the DAQ. This protocol was forward to the respective Federal Land Managers over seeing Dolly Sods, Otter Creek, James River Face, and the Shenandoah National Park. The DAQ approved this protocol on May 19, 2009.

SITE INSPECTION

The writer has visited the Maidsville site on three separate occasions. The most recent was on January 6, 2010. Construction of the facility is nearly 60% complete. Mr. Joe Douglass, Environmental Manager, and Shawn O'Conner, Operations Manager, accompanied the writer

during this visit. There are some "as built verses permitted" changes that need to be addressed in a future permit action. Longview will propose them to the DAQ once the final design of these changes has been approved for construction and/or operation. Some of these changes stem from over land coal conveyor and elimination of the coal truck dump to design and operational parameters of the cooling towers. These appear to be minor changes that need to be addressed prior to start-up.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

This permitted action focuses only on the mitigation plan. The purpose of this plan is to mitigate the sulfur deposition in the Class I areas. The modeling and as well as the BACT analysis was based on maximum SO_2 emission rate of 734 lb/hr, which equates to 3,213.52 tons per year.

It should be noted that the permit has a more stringent annual SO_2 limit for the PC boiler, which is 581 lb/hr and 2,417 tons per year. This limit was not proposed by Longview or determined by the DAQ to be BACT for the PC Boiler. Longview agreed to it as part of a settlement agreement in resolving the appeal filed by the Sierra Club, National Parks Conservation Association, and Trout Unlimited. Longview did not propose to change any part of these limits. Therefore, no further discussion of these emissions or emission limits was needed.

REGULATORY APPLICABILITY

The current mitigation plan as outlined in Permit R14-0024A as Condition A.20 is not required or mandated by any state rule or federal regulation. Longview Power proposed this plan to mitigate the predicted sulfur deposition and visibility impacts in the Class I areas. Sulfur deposition and visibility impacts are classified as "air quality related values" (AQRV) under PSD (45CSR14). The Federal Land Managers are charged with protecting the AQRV within their respective areas (45CSR§14-13.4). As part of the original plan, Longview conducted additional

long range modeling assessment to determine the offset ratios of the four quadrants of the modeling domain.

Longview claims that the owners of the allowances located within the four quadrants are not willing to sell any of their excess allowances. Neither the DAQ nor U.S. EPA have the authority to require any of these owners to sell or surrender their allowances under Acid Rain or any other rule or regulation to another owner or operator.

To expand the region to where allowances can be obtained, Longview Power submitted this permit modification in accordance with 45CSR13, which includes publishing a Class I legal ad in the *Dominion Post*, and submitting a complete application with appropriate filing fee.

AIR QUALITY IMPACTS ANALYSIS

Longview used the same methodology that was used in the original analysis to determine the benefit to the class I areas if SO_2 were retired from facilities located in a specified region (quadrant) of the modeling domain. The following table is a summary of the SO_2 Allowance Offset Modeling analysis.

Table #1 – Summary of the Original Impacts and Offset Ratios

Quadrant	Hypothetical Source Max S Deposition Kg/Ha –yr	Longview Power Max S Deposition Kg/Ha –yr	Offset Ratio
Dolly Sods Wilderness area			
SW	2.58E-02	3.53E-02	1 to 1
SE	8.71E-03	3.53E-02	4 to 1
NW	5.16E-02	3.53E-02	1 to 1
NE	9.23E-03	3.53E-02	4 to 1

One can note from this summary that existing sources located in the western part of the modeling domain have the greatest impact potential into the Class I Areas. With this observation and that there are at least 15 Part 73 listed facilities within 150 km due west of the original modeling domain, Longview conducted additional analysis to determine the net benefit of retiring allowances from Acid Rain sources in this region. Longview expanded the modeling domain to encompass approximately an area of 159 km by 339 km west of the existing modeling domain and created a additional quadrant referred to as the "Reduced Western Area" that lays within this expanded modeling domain.

During the review of R14-0024, Longview's predicted impact yields the greatest sulfur deposition in Dolly Sods, which is listed in Mr. Arrington's Memo dated August 11, 2003. Longview's predicted sulfur deposition impacts in Shenandoah National Park and Otter Creek Wilderness Area also exceed the FLM's deposition analysis threshold. Regardless of the cumulative analysis, Longview's predicted impacts affect the Air Quality Related Values for these three Class I Areas with the greatest potential occurring in Dolly Sods. Any expansion of the mitigation area should focus mainly on benefitting Dolly Sods. Longview also conducted a second analysis in order to determine the sulfur deposition benefits in the other Class I areas from expanding the mitigation area.

The following table summarizes the results of these two analyses.

Table #2 - -Summary of the Predicted Impacts from the Reduced Western Area			
Quadrant	Hypothetical Source	Longview Power	Offset Ratio
	Max S Deposition Kg/Ha –yr	Max S Deposition Kg/Ha –yr	
Reduced Western Area	2.46E-02	3.53E-02	1 to 1
Otter Creek Wilderness Area			
Reduced Western Area	3.08E-02	2.78E-02	1 to 1

James River Face Wilderness Area			
Reduced Western Area	1.36E-02	5.08E-03	1 to 1
Shenandoah National Park			
Reduced Western Area	1.50-02	1.69E-02	1 to 1

These results show that if the hypothetical source in the "Reduced Western Area" would reduce emissions by the same order as Longview's potential that all four Class I area would see at least no change or reduced impacts with regards to sulfur deposition. Thus, an offset ratio of 1:1 is appropriate for this "reduced western area". A map of the mitigation can be found at the end of the evaluation. Referring to this map, the mitigation area of this Reduce Western Area does overlap into the Northwest and Southwest Quadrants. Since the offset ratio of these three areas is 1:1 and there are no Part 73 Listed Sources located in this overlapping area, there is no need to further separate or refined this overlap section.

The agency replicated and reviewed the modeling analyses that were submitted by the agency's in-house modeler, Mr. Jon McClung, P.E. This replication validated the applicant's results. A memo regarding the review of this modeling exercise is attached to the end of this evaluation.

MONITORING OF OPERATIONS

This plan relies on measuring actual sulfur dioxide emissions from the PC boiler using a Continuous Emission Monitoring System (CEMs), which is currently required in Permit R14-0024A. Therefore, this permitting action requires no additional monitoring of the sulfur dioxide emissions from this facility.

RECOMMENDATION TO DIRECTOR

Based on the analysis included with the application, the retiring of SO_2 allowances should have nearly the same potential benefit in the Dolly Sods, Otter Creek, and James River Face Wilderness Areas, and the Shenandoah National Park. Therefore, this writer recommends that Permit R14-0024A be modified to allow the permittee to obtain and retire SO_2 allowances from the Acid Rain Program from sources located in the Reduced Western Area for the sole purposes of complying with the mitigation plan outlined as Condition A.20. in the permit.

Edward S. Andrews, P.E.
Engineer

Date: March 8, 2010

MEMO

To: Ed Andrews
Cc: John Benedict, Fred Durham, Bev McKeone
From: Jon McClung JDM
Date: February 17, 2010
Subject: Longview Power
Mitigation Plan Air Quality Modeling Results
Additional Offset Allowance Area
Application #R14-0024B

Longview Power submitted air quality modeling results for a sulfur dioxide mitigation plan to support Permit Application #R14-0024B, which was received by WVDAQ on November 6, 2009. The modeling analysis was performed pursuant to a protocol received March 9, 2009 and approved by WVDAQ on May 19, 2009. Longview seeks to obtain a permit modification to add a geographical area from which to obtain sulfur dioxide allowances to the west of the offset areas in Permit R14-0024A. I have reviewed and replicated the modeling results and find that the modeling analysis conforms to the protocol, with the exception of the location of the proposed additional offset area. Although the area submitted in this application deviates from the originally approved protocol, the resulting sulfur dioxide allowance offset ratio for the area will be 1 to 1. The results of my review are summarized here. For complete details please refer to the approved protocol, permit application, modeling report, and electronic modeling files.

To maintain consistency with previous modeling and permitting efforts, the protocol provided that the modeling analysis would use the same models, model versions, input data, and model options of the original modeling used to support Permit R14-0024. Central to the review of the modeling analysis was verifying consistency with the original modeling analysis and the approved protocol. In general, the modeling analysis was performed in a manner consistent with the original modeling. However, some parts of the modeling analysis were required to be changed because of the increased geographical area of the modeling domain.

Modeling System

The versions for the components of the modeling system (CALPUFF v5.5, CALMET v5.2, CALPOST v5.2, and POSTUTIL v1.1) were the same for this modeling analysis and the original modeling analysis. Expansion of the geographical area caused an increase in the file sizes for the CALMET data files which exceed the file size limitation for the computer operating system and compiler. The solution is to create two smaller CALMET data files per month for a total of twenty-four files for a year. This required recompilation of the CALPUFF executable file to increase the maximum number of CALMET data files from twelve to twenty-four. The source code for CALPUFF v5.5 was not independently available to allow for recompilation. Therefore, as an additional quality assurance check, the recompiled CALPUFF executable submitted by Longview

and the original CALPUFF executable (20,692 KB; 10/24/2002) were used to operate on an identical input control file and meteorological data set. The two CALPUFF executable files returned identical results and provide verification that the model was used appropriately. It is interesting to note that, to maintain consistency with the vintage of the CALPUFF version and FORTRAN compiler, the required computer operating system is Microsoft Windows 2000 without service packs installed.

The increased geographical area proposed by Longview increased the geophysical data needs. Additional terrain height and land-use data were required as input to the CALMET model for the additional model domain area. The additional data were combined with the original data for use as input using the TERREL, CTGCOMP, CTGPROC, and MAKEGEO preprocessors.

Surface station and precipitation station meteorological data were acquired for the additional area and combined the original data for use as input to the CALMET model. Several CASTNET stations were used to supply precipitation data. PMERGE, the CALPUFF system program to merge precipitation data, is unable to directly read CASTNET data. The applicant developed a program to read and merge the CASTNET data with the standard format precipitation data. A quality assurance check was performed to ensure that the CASTNET data was accurately incorporated into the PMERGE data. In addition, the OZONE.DAT file, which contains background ozone data, was expanded from the original modeling analysis to include data for the revised modeling domain.

Additional MM5 prognostic meteorological data were extracted to account for the increased modeling domain. Although the extraction procedure was not replicated, a quality assurance check indicates that the MM5 data extracted for the revised modeling domain contains data that matches the original domain while also including data for the additional offset area.

The receptor grid for this modeling analysis included receptors for the Dolly Sods Class I area and was consistent with the approved protocol.

The technical input file control options for CALMET, CALPUFF, POSTUTIL, and CALPOST were the same for this modeling analysis and the original modeling analysis. The input control files (non-technical options) were necessarily modified to allow for the additional area of the revised modeling domain and additional CALMET data files. One exception to note is that the Relative Humidity (RH), a technical option, in the CALPOST input control file was set to 95% in the original analysis but was set to 98% in this analysis. This has no effect on the results since relative humidity is only used in the visibility analysis function of CALPOST, and this was verified by replication of the results at both 95% and 98% relative humidity.

The approved protocol identified two additional areas and two hypothetical source locations to the west of the permitted offset areas (West Northwest and West Southwest) to compute sulfur dioxide allowance ratios. The modeling analysis submitted by

Longview does not contain these two areas but rather identifies a single hypothetical source within a Reduced Western Area, which slightly overlaps the currently permitted Northwest Quadrant and Southwest Quadrant. Since the computed sulfur dioxide offset ratio is the same (1 to 1) for the Reduced Western Area and both the Northwest and Southwest Quadrants, the small overlap has no effect on any required quantity of allowance purchases.

As indicated earlier, the modeling domain, for both CALMET and CALPUFF, was increased to allow for inclusion of the proposed offset area. The modeling domain and proposed offset area are not identical – the modeling domain is necessarily larger than the proposed offset area to allow for adequate functioning of the model (i.e. contain meteorological data and allow for puff recirculation). Boundaries for a modeling domain are generally established based on guidance in the Federal IWAQM Phase 2 Report which recommends extending the domain 50 km beyond the outer receptors and emission sources. Figure 1 shows the Permit R14-0024A offset areas, Reduced Western Area, hypothetical source for the Reduced Western Area, CALPUFF modeling domain, and the offset areas and hypothetical source locations proposed in the protocol.

Results

The results submitted by Longview were also obtained by replication and are shown in Table 1. For reference, the results for the currently permitted offset areas are also included.

Table 1. SO_2 Allowance Offset Ratios for Dolly Sods Wilderness Area

Quadrant	Hypothetical Source	Longview Power Project	Offset Ratio
	Max Deposition	Max Deposition	
	kg/Ha-yr	kg/ha-yr	
SW (R14-0024A)	2.58E-02	3.53E-02	1 to 1
SE (R14-0024A)	8.71E-03	3.53E-02	1 to 4
NW (R14-0024A)	5.16E-02	3.53E-02	1 to 1
NE (R14-0024A)	9.23E-03	3.53E-02	1 to 4
Reduced Western Area	2.46E-02	3.53E-02	1 to 1

Figure 1. Longview Power Mitigation Plan - Reduced Western Offset Allowance Area